PROC. ENTOMOL. SOC. WASH.
85(2), 1983, pp. 374–376

USE OF TRAP-BOARDS FOR DETECTING ADULTS OF THE BLACK VINE WEEVIL, *OTIORHYNCHUS SULCATUS* (FABRICIUS) (COLEOPTERA: CURCULIONIDAE)

Chris T. Maier

Department of Entomology, The Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven, Connecticut 06504.

Abstract.—Adults of the black vine weevil, *Otiorhynchus sulcatus* (Fabricius), used trap-boards under yews as daytime resting sites. In July monitoring trials, adults were found under trap-boards in all yew plots shown to be infested by visual examination of foliage and litter. Unlike pit-fall traps, trap-boards constructed of tempered hardboard were effective during rainy weather. Trap-boards are recommended for detecting weevils in valuable ornamental beds.

The black vine weevil, *Otiorhynchus sulcatus* (Fabricius), injures many valuable cultivated plants grown in greenhouses, nursery fields, and residential yards. Damage is caused by larvae feeding upon roots and by adults feeding upon foliage. Severe infestations can develop in one growing season because parthenogenetic adults have high fecundity on some plants (Maier, 1981; Nielsen and Dunlap, 1981). Commercial nurserymen usually make preventive insecticide applications to avoid costly problems that might arise from failure to detect weevil infestations (G. Schuessler, personal communication). Although this tactic is usually effective, it results in many unnecessary sprays.

An alternative method of controlling weevils is to monitor for the nocturnal adults and then, if they are detected, to apply an insecticide. Adults can be observed during the day although searches of soil, debris, and foliage are laborious. They can also be detected with funnel or pit-fall traps (Cone, 1963; Emenegger and Berry, 1978; Nielsen et al., 1978), but these devices have inherent problems which will be discussed.

In this paper, I discuss using trap-boards to detect live adult weevils in ornamental plantings. This type of sampling device capitalizes on the diurnal adult behavior of resting in shaded areas, especially under debris near the base of plants (e.g. Smith, 1932).

Materials and Methods

From April to October 1981, *O. sulcatus* adults were detected by inspecting trap-boards located on the ground under *Taxus cuspidata* Sieb. and Zucc. in Connecticut. For monitoring trials during July, squares of tempered hardboard (25 × 25 × 0.3 cm thick) were placed on the ground under five yews, one per yew, in each of 33 plots in nurseries and four in residential yards. The canopy diameter of these yews ranged from 0.4–1.5 m. Trap-boards in nursery fields were separated by about 50 m, with two along the northern edge, two along the southern edge, and one equidistant from the other four. In residential yards, they were placed in a straight line, with each board separated by about 3 m. Squares were inspected five days later for adult weevils resting on or under them. The closest yew to each board and debris beneath it were also examined for 2 min for adult feeding notches and live adults, respectively.

To determine if introduced weevils (= immigrants) would rest under trap-boards, mark-release-recapture trials were conducted in two infested yew plots, one in a nursery field and one in a residential yard. On 24 July 1981, one hundred weevils marked on their elytra with paint were released in lots of 20 around each of the five trap-boards in each plot. Weevils were placed under the five yews (four per plant) nearest to the one with the trap-board. Trap-boards were inspected five days later for marked adults.

Twenty pit-fall traps placed in an unsprayed nursery plot were examined between 12 June and 3 July and between 10 and 31 August 1981 to determine what problems were associated with their use. Pit-falls were #10 tin cans that were punctured in the bottom for drainage. Plastic funnels fitted in the open top guided insects into a 250 ml beaker that contained 100 ml of 95% ethyl alcohol. Samples were collected twice weekly during the first sampling period and once weekly during second sampling period.

Results and Discussion

Weevils rested under trap-boards in all five yew plots in which adults were detected by visual examination of foliage and litter. Fresh feeding scars and live adults were absent in the remaining 32 plots. In infested beds in nurseries (n = 3) and residential yards (n = 2), 20 (87%) of 23 trap-boards under infested plants (two yews were not infested) sheltered unmarked weevils. The number of unmarked adults under these 23 boards averaged 3.2 ± 4.49 (SD). In the two releases of 100 marked weevils, 7 (7%) and 9 (9%) adults rested under boards in the nursery and the residential plot, respectively, after five days.

Pit-fall traps, unlike trap-boards, were ineffective when they were used during rainy weather. Pit-falls placed near yews collected water during rainy periods even though the cans had drainage holes in the bottom. Traps flooded four times between 12 June and 3 July, and this flooding resulted in partial loss of the sample, dilution of the fluid preservative, and soil deposition in the collection container. To prevent trapped insects from decaying in diluted alcohol, the preservative had to be replaced after each rain. Another problem was that during each collection period debris had to be removed from 15–40% of the funnels in the pit-falls. Trap-boards had none of the aforementioned problems because they did not confine insects in containers below ground level. They did become wet during rains and did warp up to 1 cm during the growing season. Nonetheless, weevils still rested under them.

Success of inexpensive hardboard squares (cost in 1981: $0.14–0.17 per 25 × 25 cm square of tempered hardboard) in attracting resident and introduced, marked adults of *O. sulcatus* indicates that they are effective monitoring devices. Trap-boards appear to be superior to pit-fall traps because they are useful in all types of weather. Collectively, my results suggest that trap-boards can assist nurserymen and homeowners in detecting resident and immigrant adults in their valuable ornamental beds. Easy detection of adults should help to improve the timing of insecticide applications for adult control and to reduce the number of unwarranted sprays.

Acknowledgments

David Wagner assisted in all phases of the monitoring exercise. Robert Moore, George Schuessler, and Peter Trenchard (Connecticut Agricultural Experiment Station, New Haven) directed me to Connecticut nurseries and participated in discussions about the usefulness of trap-boards.

Literature Cited

Cone, W. W. 1963. The black vine weevil, *Brachyrhinus sulcatus*, as a pest of grapes in south central Washington. J. Econ. Entomol. 56: 677–680.

Emenegger, D. B. and R. E. Berry. 1978. Biology of strawberry root weevil on peppermint in western Oregon. Environ. Entomol. 7: 495–498.

Maier, C. T. 1981. Reproductive success of the black vine weevil, *Otiorhynchus sulcatus* (F.), fed different foliar diets and evaluation of techniques for predicting fecundity. Environ. Entomol. 10: 928–932.

Nielsen, D. G. and M. J. Dunlap. 1981. Black vine weevil: reproductive potential on selected plants. Ann. Entomol. Soc. Am. 74: 60–65.

Nielsen, D. G., M. J. Dunlap, and J. F. Boggs. 1978. Progress report on research in black vine weevil control. Ohio Rep. 63: 41–44.

Smith, F. F. 1932. Biology and control of the black vine weevil. U.S. Dep. Agric. Tech. Bull. 325, 45 pp.